Targeted Irrigation System Hardware Upgrades

2003 Urban Water Conservation Program Grant Application

submitted to

California Department of Water Resources
Office of Water Use Efficiency
1416 Ninth Street, Room 338
Sacramento, CA 95814
Attention: Marsha Prillwitz (916)651-9674

December 3, 2002

by the

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118
tel: 408/265-2600
Contact: Hossein Ashktorab

Cover Letter

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

December 3, 2002

Marsha Prillwitz
California Department of Water Resources
Office of Water Use Efficiency
1416 Ninth Street, Room 338
Sacramento, California 95814

Dear Ms. Prillwitz:

It is our honor to submit an application to the California Department of Water Resources 2003 Urban Water Conservation Grant Program. The enclosed application includes a request for a grant to help complete the investment in important conservation equipment in uniquely well-targeted landscape sites.

Please contact us if you have questions or if we can provide additional information.

Thank you for your consideration.

Sincerely,

Hossein Ashktorab, Ph.D.
Manager, Water Use Efficiency Unit

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Application Part A — Project Description, Organizational, Financial and Legal Information

A-1 Urban Water Conservation Grant Application Cover Sheet

1. Applicant (Organization or affiliation): Santa Clara Valley Water District
2. Project Title: Targeted Irrigation System Hardware Upgrades

3. Person authorized to sign and submit proposal:

Name, Title	Hossein Ashktorab, Water Use Efficiency Unit Manager
Mailing address	5750 Almaden Expressway San Jose, CA 95118-3614
Telephone	(408) 265-2600
Fax	(408) 267-3127
E-mail	hashktorab@valleywater.org

4. Contact person (if different):

Name, Title	(same)
Mailing address	
Telephone	
Fax	
E-mail	

5. Funds requested (dollar amount): $100,000
6. Applicant funds pledged (local cost share) (dollar amount): $88,709
7. Total project costs (dollar amount): $188,709

8. Estimated net water savings (acre-feet/year): 149 AF/YR
   Estimated total amount of water to be saved (acre-feet):
   Over 10 years 14,900 AF

   Benefit/cost ratio of project for applicant: 5.47
   Estimated $/acre-feet of water to be saved: $127/AF

9. Project life (month/year to month/year): 09/2003 to 09/2005 (Implementation)
10. State Assembly Districts where the project is to be conducted: 20, 21, 22, 23, 24, 27 & 28
11. State Senate District where the project is to be conducted: 10, 11, 13, 15
12. Congressional District(s) where the project is to be conducted: 14, 15, 16, 17
13. County where the project is to be conducted: Santa Clara County
14. Do the actions in this application involve physical changes in land use, or potential future changes in land use?
    (a) Yes
    (b) No **X**

A-2 Application Signature Page

By signing below, the official declares the following:

The truthfulness of all representations in the application;

The individual signing the form is authorized to submit the application on behalf of the applicant;

The individual signing the form read and understood the conflict of interest and confidentiality section and waives any and all rights to privacy and confidentiality of the application on behalf of the applicant; and

The applicant will comply with all terms and conditions identified in this Application Package if selected for funding.

_____	_____	_____
Signature	Name and title	Date

A-3 Application Checklist

Complete this checklist to confirm all sections of this application package have been completed.

Part A: Project Description, Organizational, Financial and Legal Information

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Part D: Need for Project and Community Involvement

_____D-1 Need for project
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Part E: Water Use Efficiency Improvements and Other Benefits

_____E-1 Water use efficiency improvements
_____E-2 Other project benefits

Part F: Economic Justification, Benefits to Costs Analysis

_____F-1 Net water savings
_____F-2 Project budget and budget justification
_____F-3 Economic efficiency
_____Benefit/Cost Analysis Tables 1; 2; 3; 4a, 4b, 4c, 4d; and 5

A-4 Description of Project

Purpose, goals, and objectives

This project is targeted at installing upgraded irrigation hardware for sites previously identified as having high unrealized conservation potential in the Santa Clara Valley Water District's Irrigation Technical Assistance Program (ITAP). By building on the customer information accrued through the ITAP program in the last three years, this program aims at difficult-to-attain but cost-effective landscape conservation on sites with greater than one acre of irrigated landscape. These hardware installations can be expected to produce water savings of longer persistence than the savings that can be attained through behavior change alone.

Location

The Santa Clara Valley Water District has enlisted the support of its retail agencies in identifying appropriate sites and cooperating with customer outreach efforts. This program also builds on the customer outreach efforts of SCVWD's ongoing Irrigation Technical Assistance Program. An increased level of customer participation can be expected through the offer of economic incentives on new irrigation equipment. This is but one example of the synergies between this grant and an ongoing customer outreach program such as ITAP. The irrigation equipment rebates would build on the customer information developed by the ITAP program and target its economic incentives exactly in the market segments where conservation potential is greatest.

Summary of methods and procedures

To the extent that pre-funded ET controllers are available from other grants, this program would allow ITAP to offer a complete package of needed equipment upgrades. If not, this program would consider funding ET controllers as part of a complete package slotted toward the most appropriate customers. The level of hardware funding per site would vary between $200 and $1,000 as a function of potential conservation as estimated by the existing ITAP protocol. A total of $100,000 is being requested over a three-year implementation period. The program implementation would be front-loaded in the first year of program implementation, to maximize early water savings.

Summary of expected outcomes, benefits, and costs

The expected results of this program extend beyond the immediate, albeit large, water savings. By scaling the early success stories and establishing customer acceptance, this program can achieve realization of that last amount of unrealized large landscape water conservation. Results of customer experiences and reductions in water consumption will be monitored and tracked for integration into SCVWD's Integrated Water Resource Plan.

The total cost of the program, including in-kind contributions from agencies is $188,709. In-kind contributions from participating agencies are $88,709. This proposal requests $100,000 in grant funding.

The total water savings is expected to be 149 acre-feet per year, which translates into benefits (avoided costs) of $140,328 per year.

A-5 Maps

Since this is not a construction project, a map is not required.

A-6 Statement of Work, Schedule

Tasks

Task 1. Review the Irrigation Technical Assistance Program (ITAP) sites surveyed over the past three years to determine equipment upgrades not yet implemented. (Since the program has been in place since 1995, earlier surveys can also be included). Since the ITAP reports identify all hardware deficiencies, the opportunities for conservation savings are already well identified and ready for upgrades. This task simply calls for the review of the equipment upgrade recommendations and determination of which have yet to be implemented—these then constitute the targeted conservation opportunities.

SCVWD is in a unique position of having collected site-specific equipment information during previous ITAP audits. With the equipment needs already identified, the funded irrigation equipment can be slotted exactly where it is needed. Although the needed equipment upgrades may be distributed over numerous large sites, the ITAP information has already identified equipment needs; thus, quick find and fix missions are feasible. Examples of the types of upgrades that are identified in the ITAP reports and which would be funded include:

- Irrigation controllers. Although most sites have controllers as identified in the ITAP program, old models do not have the adjustments needed to fully take advantage of water savings opportunities. Controllers that make available repeating cycles, CIMIS-based timing, and ease of adjustment allow for more efficient programming.

- Sub-area controllers. Due to varied sub-climates (shady areas, etc.) and topography (flats and slopes) separate irrigation controllers that operate on segments of the landscape area can be used to reduce water consumption. Battery operated models might allow tailored cycles in distant areas.

- Sprinkler heads replacement and matching. Sprinkler heads that are mismatched with brass and plastic models result in water waste (mixed heads result in uneven pressure to brass heads). Sprinkler heads in high traffic areas can be replaced with durable models that will not need as frequent repairs and adjustment. Replacing old sprinkler heads allows more refined adjustment and distribution uniformity, again reducing water waste.

- Pressure regulator valves. Most sprinkler heads are designed to operate in the 25 to 30 psi range. Many irrigation systems have been installed without proper testing for installed pressure. Pressure regulators serve to keep pressure from rising too high in the

irrigation system. Excessive pressure results in sprinkler head misting, wind drift, and water loss. Also, high pressure increases the incidence and severity of leakage in irrigation systems. Controlling high water pressure in the system also reduces the changes that low pressure will occur in other areas of the system that are prone to pressure loss—again resulting in more efficient use of irrigation water.

Task 2. Contact sites and offer incentives for implementing ITAP equipment recommendations that have not already been implemented. This task illustrates how the grant funded irrigation hardware will piggyback upon SCVWD's existing program. The previous reports have already identified key individuals that make decisions at the irrigation site and discuss with authority possible equipment upgrades. Site visits would be needed only when there has been a significant change at the site since the ITAP report was created or if new opportunities for upgrades present themselves (landscape alteration, hardware deterioration, etc.)

As currently envisioned, we propose that the incentives be structured as a 50 percent cost share of the hardware upgrades recommended in the ITAP reports. We invite feedback from DWR and CALFED representatives regarding the program structure to better align our objectives with the broader regional and state goals for water resources management. For example, incentives could be provided in other formats, such as a financial incentive linked to a water budget or savings objective. For example, 100 percent of the upgrade would be covered if the potential water savings of a certain level --as identified in the ITAP report-- were achieved in practice,

Task 3. Integrate hardware incentives program into ongoing ITAP surveys. Since the surveys are identifying more and more sites and associated opportunities for equipment upgrades that are associated with conservation savings, the program will be continued into the future for the duration of the grant period. It is expected that equipment incentives will increase customer satisfaction, willingness-to-participate, and, ultimately, the amount of potential water savings that can be realized. Appropriate irrigation equipment can yield both improved landscape appearance and water savings. Better landscape appearance and customer satisfaction can lead to a longer life on water savings.

Task 4. Track installations and associated costs and savings. Review annually. Through a process of continual customer inquiry and feedback, the program implementation will be streamlined, improved, and evaluated over time.

Task 5. Coordination and Administration. This task involves the coordination and administration of all program elements.

Deliverables

The expected products of the grant program include the following:

- Tracking reports, quarterly and annually.

- Annual evaluation memo to the Board, including all the assessment measures listed above.

- Presentation at an evening discussion forum conducted early in the program, and there after at six month or one year intervals. The invitees would be past present and potential future participating landscape site managers. The presentations would cover the program elements, performance, and requests for input.

- AWWA paper and presentation by staff.

Schedule

Funds are being requested over a three-year implementation period (Table A). The program implementation would be front-loaded in the first year of program implementation, to maximize early water savings.

Table A - Schedule

Task	Start Date	Duration (Days)	End Date
Task 1: Determine Equipment Upgrades	1-Jul-2003	62	31-Aug-03
Task 2: Site Contact and Incentives Offering	1-Sep-2003	300	26-Jun-04
Task 3: Integrate Incentives to Ongoing ITAP	1-Sep-2003	900	16-Feb-06
Task 4: Tracking and Reporting	1-May-2004	650	9-Feb-06
Task 5: Coordination and Administration	1-Jul-2003	950	4-Feb-06

Separability of tasks

The tasks listed above are not readily separated. However, the scale of the project can be adjusted to fit alternative budgets.

Projected costs by task

Table B shows the project costs by task, with cost shares calculated.

Table B: Budget for SCVWD Targeted Irrigation Incentive Program

	SCVWD: Water Use Efficiency Unit Manager		SCVWD: Water Conservation Specialist 1		SCVWD: Water Conservation Specialist 2		Total	
Rate:	$53.94/hr.		$32.61/hr.		$35.99/hr.			
Task	Hours	Cost	Hours	Cost	Hours	Cost	Hours	Cost
Task 1: Determine Equipment Upgrades	18	$ 949	35	$ 1,148	35	$ 1,267	88	$ 3,364
Task 2: Site Contact and Incentives Offering	24	$ 1,295	48	$ 1,565	48	$ 1,728	120	$ 4,587
Task 3: Integrate Incentives to Ongoing ITAP	16	$ 863	32	$ 1,044	32	$ 1,152	80	$ 3,058
Task 4: Tracking and Reporting	16	$ 863	32	$ 1,044	32	$ 1,152	80	$ 3,058
Task 5: Coordination and Administration	16	$ 863	32	$ 1,044	32	$ 1,152	80	$ 3,058
Total	90	$ 4,833	179	$ 5,844	179	$ 6,449	448	$ 17,126

	Collaborating Agencies: Water Use Efficiency Unit Manager		Collaborating Agencies: Water Conservation Specialist 1		Collaborating Agencies: Water Conservation Specialist 2		Total	
Task	Hours	$53.94/hr.	Hours	$32.61/hr.	Hours	$35.99/hr.	Hours	$/Task
Task 1: Determine Equipment Upgrades	8	$ 432	16	$ 522	16	$ 576	40	$ 1,529
Task 2: Site Contact and Incentives Offering	24	$ 1,295	48	$ 1,565	48	$ 1,728	120	$ 4,587
Task 3: Integrate Incentives to Ongoing ITAP	16	$ 863	32	$ 1,044	32	$ 1,152	80	$ 3,058
Task 4: Tracking and Reporting	12	$ 647	24	$ 783	24	$ 864	60	$ 2,294
Task 5: Coordination and Administration	16	$ 863	32	$ 1,044	32	$ 1,152	80	$ 3,058
Total	76	$ 4,099	152	$ 4,957	152	$ 5,470	380	$ 14,527

	Evaluation Contractor		Total	
Task	Hours	$100/hr.	Hours	$/Task
Task 1: Determine Equipment Upgrades	-	$ -	-	$ -
Task 2: Site Contact and Incentives Offering	40	$ 4,000	40	$ 4,000
Task 3: Integrate Incentives to Ongoing ITAP	40	$ 4,000	40	$ 4,000
Task 4: Tracking and Reporting	80	$ 8,000	80	$ 8,000
Task 5: Coordination and Administration	-	$ -	-	$ -
Total	160	$ 16,000	160	$ 16,000

Summary	SCVWD	Collaborating Agencies	Evaluation Contractor	
Raw Labor	$ 17,126	$ 14,527	$ 16,000	$ 47,653
Overhead (@120.23%)*	20,591	17,465	included	$ 38,056
Local Travel and Transportation	$ 1,000	$ 1,000	$ 1,000	$ 3,000
Rebates to Customers Participating	$ 100,000			$ 100,000
Total Project Costs	$ 138,717	$ 32,992	$ 17,000	$ 188,709
Participant Agency Costs	$ 38,717	$ 32,992	$ 17,000	$ 88,709
Requested Grant Funding = Rebates to Customer	$ 100,000	$ -	$ -	$ 100,000

*FY 2000-01 SCVWD's Federal Office of Management & Budget (OMB) Circular A-87 Overhead Rate = 120.23% (Will apply current rate to Actual Claim.)

Quarterly expenditure projection

Table C shows the projected quarterly expenditures.

Table C - Quarterly Expenditure Projection

Quarter	Percent	Total	Grant
1	15.0%	$ 28,306	$ 15,000
2	20.0%	$ 37,742	$ 20,000
3	10.0%	$ 18,871	$ 10,000
4	10.0%	$ 18,871	$ 10,000
5	5.0%	$ 9,435	$ 5,000
6	5.0%	$ 9,435	$ 5,000
7	5.0%	$ 9,435	$ 5,000
8	5.0%	$ 9,435	$ 5,000
9	5.0%	$ 9,435	$ 5,000
10	5.0%	$ 9,435	$ 5,000
11	5.0%	$ 9,435	$ 5,000
12	10.0%	$ 18,871	$ 10,000
Total	100.0%	$ 188,709	$ 100,000

Summary: Technical Adequacy and Readiness to Proceed

The proposed program represents a particularly ripe opportunity for equipment upgrade funding for the following reasons:

- Well-trained and experienced landscape experts have completed the technical assessments of irrigation management and potential savings. New irrigation analyses are being conducted as well. The rest of audit and plan for conservation is completed; thus there is therefore more bang for the equipment upgrade buck.

- Not only have the sites been identified, but the specific equipment needs as well.

- The sites and the equipment upgrades are not of the garden variety. They are the hard to find, unique conservation opportunities that can only be determined with the kind of detailed and targeted assessments compiled in the ITAP program. This is conservation that would not otherwise be identified and accomplished.

A-7 Monitoring and Evaluation

The benefits expected from this project include:

- Water conservation benefits include reduced Bay Delta environmental stress and reduced water costs;
- Healthier landscapes with reduced replacement costs; and
- Reduced dry-season run off and surface water flow contamination.

A more detailed description of the benefits is included in Section E below.

Assessment procedures:

This program includes a focused evaluation component in the program to assess costs and savings, in keeping with SCVWD's Integrated Water Resources Plan (IWRP). In particular:

- Cost data will be maintained by SCVWD;
- Savings can be assessed with billing histories, which are already maintained at the retail agencies; and
- A summary report and data will be available at the end of the evaluation.

Performance Measures

Performance will be evaluated with regard to the goals and objectives of the program. Measures of performance will include:

- The share of the recommended equipment upgrades in the ITAP reports that have been implemented.
- The measured water savings as determined with billing system histories.
- Costs of the program as tracked by program administrators.
- Cost per acre foot savings as calculated from the above data.
- Persistence of savings as tracked by the program over time.

Data will be tracked by staff and will be available in readily accessible formats (e.g. Excel or Access).

Products

The expected products of the grant program include the following:

- Tracking reports, produced quarterly and annually.
- An annual evaluation memo to the Board, including all the assessment measures listed above.
- Presentations at an evening discussion forum conducted early in the program and thereafter at six month or one year intervals. The invitees would be past, present and potential future participating landscape site managers. The presentations would cover the program elements, performance, and requests for input.
- A brief executive summary of the project to help disseminate the results of this study to the broader conservation community.

A-8 Qualifications of the Applicant and Cooperators

Resume of the project manager.

Attached to the end of the Application.

External Cooperators

The general roles of the external cooperators will consist of the following:

- Project direction and oversight
- Funding support
- Site location
- Assessment of project costs and benefits from different agency perspectives: groundwater, wastewater, reclamation, wholesale and retail water supply.
- Identify cost-effective opportunities for cooperation on additional programs where mutually beneficial.
- Assessment of implementation barriers and opportunities at different agency perspectives.

A-9 Innovation

The innovative work involved with the grant is in the implementation and delivery mechanism of this conservation program, including:

- Coordination of landscape audit programs with equipment funding mechanisms (ITAP program with Proposition 13 equipment funding);

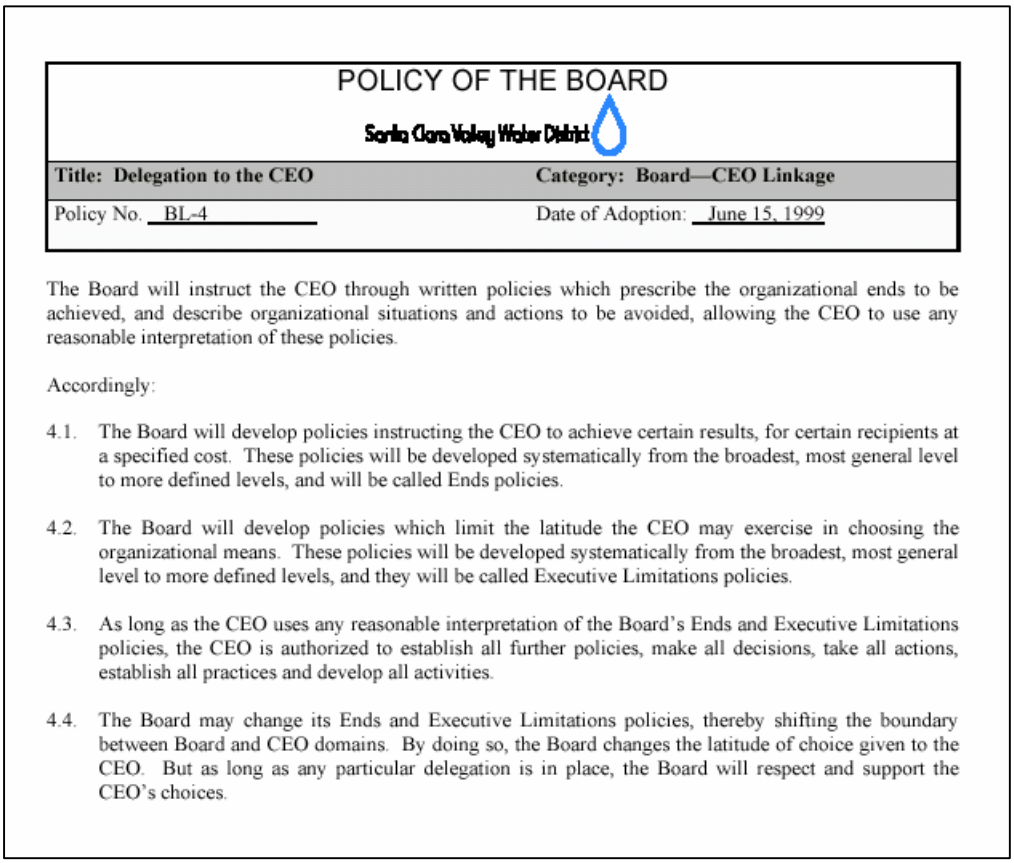
- Providing information and education as an essential first step, with equipment and implementation funding a combination of site owners, and outside sources where needed.

A-10 Agency Authority

Address the following five questions pertaining specifically to this application.

1. Does the applicant (official signing A-2, Application Signature Page) have the legal authority to submit an application and to enter into a funding contract with the State? Provide documentation such as an agency board resolution or other evidence of authority.

   Yes. The document below provides such authority.



POLICY OF THE BOARD

Santa Clara Valley Water District

Title: Delegation to the CEO	Category: Board—CEO Linkage
Policy No. BL-4	Date of Adoption: June 15, 1999

The Board will instruct the CEO through written policies which prescribe the organizational ends to be achieved, and describe organizational situations and actions to be avoided, allowing the CEO to use any reasonable interpretation of these policies.

Accordingly:

4.1. The Board will develop policies instructing the CEO to achieve certain results, for certain recipients at a specified cost. These policies will be developed systematically from the broadest, most general level to more defined levels, and will be called Ends policies.

4.2. The Board will develop policies which limit the latitude the CEO may exercise in choosing the organizational means. These policies will be developed systematically from the broadest, most general level to more defined levels, and they will be called Executive Limitations policies.

4.3. As long as the CEO uses any reasonable interpretation of the Board's Ends and Executive Limitations policies, the CEO is authorized to establish all further policies, make all decisions, take all actions, establish all practices and develop all activities.

4.4. The Board may change its Ends and Executive Limitations policies, thereby shifting the boundary between Board and CEO domains. By doing so, the Board changes the latitude of choice given to the CEO. But as long as any particular delegation is in place, the Board will respect and support the CEO's choices.

2. What is the legal authority under which the applicant was formed and is authorized to operate?

   Santa Clara Valley Water District Act. The Santa Clara Valley Water District was created by an act of the California Legislature, and operates as a state of California Special District, with jurisdiction throughout Santa Clara County.

3. Is the applicant required to hold an election before entering into a funding contract with the State?

   No.

4. Will the funding agreement between the applicant and the State be subject to review and/or approval by other government agencies? If yes, identify all such agencies (e.g. Local Area Formation Commission, local governments, U.S. Forest Service, California Coastal Commission, California Department of Health Services, etc.).

   No.

5. Is there any pending litigation that may impact the financial condition of the applicant, the operation of the water facilities, or its ability to complete the proposed project? If none is pending, so state.

   No.

A-11 Operations and Maintenance

(Required for construction projects only, including meter installations.)

Since this is not a construction project, this section is not applicable.

Application Part B—Engineering and Hydrologic Feasibility

(Application Part B required for construction projects only, including meter installations.)

The proposed project does not involve construction. This section of the application is not applicable.

Application Part C—Plan for Completion of Environmental Documentation and Permitting Requirements

The application must include a plan for compliance with all applicable environmental requirements. The plan should address all the potential environmental, social and economic impacts of the proposed project, including mitigation, required under the California Environmental Quality Act (CEQA) and, if applicable, the National Environmental Policy Act (NEPA). The plan should also address compliance with local, county, State, and federal permitting requirements. If this project is not subject to CEQA or NEPA, so state in this section.

C-1 California Environmental Quality Act and National Environmental Policy Act

The proposed project in this application is not likely to be subject to CEQA/NEPA requirements.

Necessary documentation will be completed prior to contract execution.

C-2 Permits, Easements, Licenses, Acquisitions, and Certifications

Not applicable.

C-3 Local Land Use Plans

Not applicable.

C-4 Applicable Legal Requirements

Not applicable.

Application Part D- Need for Project and Community Involvement

D-1 Need for the Project

Urgency

This project would serve to address environmental needs in the Bay Delta. The Bay-Delta ecosystem is stressed in terms of the balance between supply and demand, water quality in surface and groundwater, salt-water intrusion, and habitat management. It has become increasing clear that careful planning is needed to avoid and mitigate problems surrounding surface run off as well as supply.

Although there have been major recent advances in the efficiency of water irrigation equipment, there is little awareness of the existence or benefits of the new technologies for plant health, landscape maintenance, and runoff reduction among the relevant customer populations. The participating water agencies have experience in cost-effectively promoting these technologies and have identified where the most strategic opportunities lie.

Water system condition

Though SCVWD's water supply-demand balance is not currently in a critical condition, its recently completed Integrated Water Resources Plan (IWRP) takes a longer view. The IWRP identifies water conservation as an integral part of the county's long-term water resources portfolio.

The District supplies water to local water retail agencies, which in turn provide it to their customers in Santa Clara County. The water supply in this integrated system comes from a variety of sources. Nearly half is from local groundwater aquifers, and more than half is imported from the Sierra Nevada through pumping stations in the Sacramento-San Joaquin River Delta. The District has also invested in water conservation programs and water recycling. Both groundwater and imported water are sold to retailers. The District also manages the groundwater basin to the benefit of agricultural users and other independent groundwater pumpers.

For substitute supplies, the District has entered into a long-term water banking program with the Semitropic Water Storage District and may pursue other water banking alternatives in the future. The District's 2001 Urban Water Management Plan (UWMP) has not identified the need for any supplemental water supplies before the 2005 to 2010 time frame, in part due to investments in water conservation and water recycling.

The District has three geographically-dispersed water treatment plants (WTP): the Rinconada WTP, the Penitencia WTP, and the Santa Teresa WTP. Treated water pipelines that distribute water from the treatment plants to the water retailers include: the West Pipeline, the Campbell Distributary, the Santa Clara Distributary, the Mountain View Distributary, and the Sunnyvale Distributary from

Rinconada WTP; the Snell Pipeline and Graystone Pipeline from Santa Teresa WTP; and the East Pipeline and Milpitas Pipeline from Penitencia WTP.

Consistency with other water management plans

The project is consistent with other state, regional, and local conservation planning activities:

Urban Water Management Plans. Irrigation savings can contribute to achieving year-round water savings as well as crucial peak-season savings.

MOU and BMPs. This program generally contributes to the MOU conservation objectives. In particular, the program would dovetail with BMP 5 if used in conjunction with a water budget.

Local groundwater basin management plans would be supported by efficient water use and reduces contaminants through deep percolation.

SCVWD Integrated Water Resources Plan. This plan seeks to put conservation measures on equal footing with supply measures to meet the region's water needs. This can only be defensible if reliable and measurable savings can be determined.

Impact if not constructed

Since this is not a construction project, the impact of not implementing the project is that the stresses on the water management system would be proportionally higher (roughly speaking). In other terms, the expected impacts would not be a single large shock, but rather incremental impacts associated with increasing need for water and decreasing ability to use water for ecosystem management.

As such, we would expect that not implementing the project would result in higher costs of water and reduced reliability solely to the extent of the project savings. Likewise, the project will contribute to CALFED objectives, as described in the benefits section. Thus, impacts on the Bay Delta Ecosystem would be of the scale commensurate with program savings.

D-2 Outreach, Community Involvement, Support, Opposition

Community based organizations and watershed groups

As part of the early planning of the project, we propose to identify community based organizations and watershed groups who may have an interest in this program. The following categories indicate the breadth of this outreach:

- Landscape organizations and "green" professionals
- Large landscape owners/customers
- Trade groups (golf association)
- Environmental interests regarding parks, watershed, etc.

We envision an early project conference with broad coverage to receive community and professional input. We also plan later conferences and/or correspondence with professionals involved with implementing the program.

Fit with local agency plans

Urban Water Management Plans. Irrigation savings contributes to achieving water savings, including peak-season savings.

MOU and BMPs. This program generally contributes to the MOU conservation objectives in BMP 5.

Local groundwater basin management plans would be supported by reducing deep percolation of contaminants.

SCVWD Integrated Water Resources Plan. This plan seeks to put conservation measures on equal footing with supply measures to meet the region's water needs. This can only be defensible if reliable and measurable savings can be determined.

Local agencies

This project as proposed in this grant application would be administered and conducted primarily by the Santa Clara Valley Water District. As a regional water wholesaler and groundwater agency, the SCVWD has strong reasons itself to investigate landscape irrigation efficiency. However, since the water system is complex in the region, irrigation technology has potential benefits across a number of agency jurisdictions. SCVWD expects to approach a number of potential beneficiary agencies as the project moves forward and to seek collaboration and coordination.

The general roles of the external cooperators will consist of the following:

- Project direction and oversight;
- Funding support;
- Site location;
- Assessment of project costs and benefits from different agency perspectives: groundwater, wastewater, reclamation, wholesale and retail water supply;
- Identify cost-effective opportunities for cooperation on additional programs where mutually beneficial;
- Assessment of implementation barriers and opportunities at different agency perspectives.

As water suppliers, the cities and water companies in the area have interests in moving customers from inefficient water practices as a demand management tool. Some of the potential beneficiaries and collaborators for this project include the following:

a) City of Mountain View Public Services Department (Water)

b) City of Sunnyvale Public Works Department (Water)

c) California Water Service Co.

d) City of Gilroy

e) City of San Jose

f) City of Morgan Hill

g) City of Santa Clara

h) City of Milpitas

i) City of Palo Alto

j) Great Oaks Water Co.

k) San Jose Water Co.

Opposition

We have not identified any potential interests that would be in opposition to this program.

Application Part E—Water Use Efficiency Improvements and Other Benefits

E-1 Water Use Efficiency Improvements

The application sates:

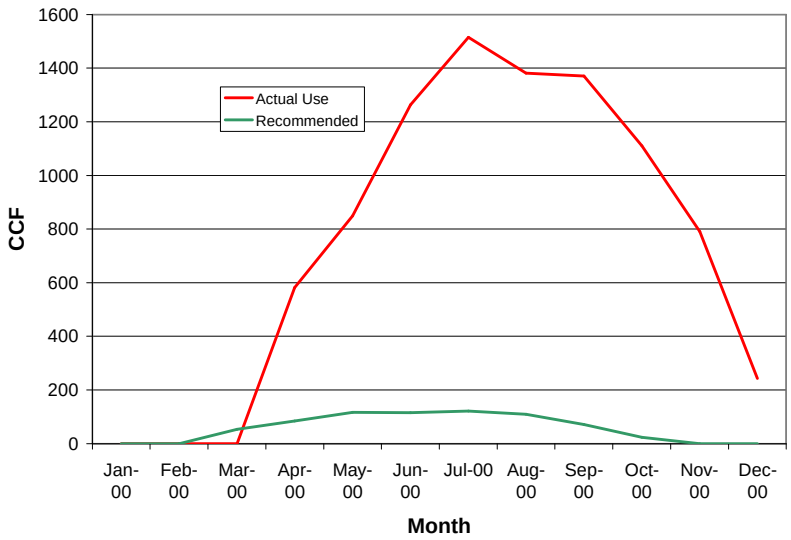
“For purposes of this application, water use efficiency means an action or an activity that causes the net value of the beneficial use of water to be increased. This increase can be due to a decrease in the costs associated with the use of that water (e.g., reduced acquisition and/or treatment costs), an increase in the value generated by the use of that water (e.g., increased urban, agricultural, or environmental water supply reliability) or both.”

We start with the water savings, and then address decreased costs and increased value below.

Use less water

The Quail Hollow ITAP report states that Year 2000 actual use was 8,410 ccf more than their recommended level of irrigation for the 2.6 acre site (Fig. 1). This translates into 3,235 ccf per acre per year in savings, or 7.4 annual acre feet. We assume—for the sake of being conservative on the side of underestimating savings—that only 20 percent of these savings are attributable to hardware upgrades and that that the resulting 1.49 acre feet per year savings are typical of other sites in the program. Assuming that 100 acres were reached by this program, the resultant water savings would total 149 acre feet per year.

Figure 1 - Actual and Recommended Use in 2000



Decrease in cost of using water:

The following are landscape benefits that are cited in the ITAP report for Quail Hollow:

- Less mowing and pruning because excess water accelerates growth.
- A reduced fertilizer requirement as over-irrigating leaches water from the root zone.
- Less property damage-sprinkler runoff water can damage parking lot pavement and over-spray can damage buildings and wooden fences.
- Less landscape chemicals enter the groundwater basin through deep percolation.
- Fewer pesticides because lush growth from over-watering attracts pests.
- Fewer accidents because sprinkler over spray creates slippery sidewalks.

Increased in value generated by the use of the water:

Clearly the healthier landscapes will increase property values and use value for large landscape sites. For residential sites, improved landscape health increases the value by creating an intrinsically more desirable setting. For golf courses, healthy landscape leads to better playing turf and golfer votes of confidence. For parks and schools, there are fewer muddy shoes, skinned knees and dusty dirty clothes.

E-2 Other Project Benefits

This project will have several important positive impacts on the Bay-Delta ecosystem:

- Replacing and repairing irrigation equipment will reduce demand for water imported from the Bay-Delta to urban water agencies.
- Replacing and repairing irrigation equipment will reduce the introduction of contaminants in surface dry-season runoff and deep percolation to groundwater basins that are part of the Bay-Delta ecosystem.
- Efficient irrigation systems are also more energy efficient in terms of

pumping and treatment, saving the Bay-Delta ecosystem an increment of environmental damage resulting from energy production and distribution.

This project is consistent with the CALFED objectives in that it:

- Contributes to water quality by reducing contaminants to the ecosystem;
- Reduces demand allowing for improvements in habitat and ecosystem functions; and
- Generally reduces the mismatch between Bay-Delta water supply and demand.

Application Part F – Economic Justification: Benefits to Costs

F-1 Net Water Savings

The application defines net savings as follows:

"Net water savings means savings achieved by reducing water losses that are currently going to an "unusable" destination from an already-developed primary water source or sources. Net water savings can be achieved by:

- Reducing losses to the atmosphere through evaporation or transpiration
- Reducing losses to saline or other unusable aquifers or water bodies through percolation or surface flows."

In what follows, we consider first savings calculations, then discuss the two criteria of loss to atmosphere and to unusable water bodies.

Water savings

We expect considerable savings in water consumed by the sites that participate in this program. As mentioned previously, the savings estimated by the ITAP reports is considerable, where savings is defined as the difference between actual water consumed and the recommended irrigation.

As an example, we presented the Quail Hollow ITAP report (full report reproduced in Appendix B), which shows Year 2000 actual use was 8,410 ccf more than their recommended level of irrigation for the 2.6 acre site, or equivalently 7.4 annual acre feet savings per acre. We make the assumption that only 20 percent of these savings are attributable to hardware upgrades. Thus, 1.49 acre-feet per year savings is a typical calculation of sites in the program.

Reduce loss to atmosphere through evaporation or transpiration

What would have happened to the saved water? One of the outcomes is clearly loss to evaporation and transpiration. For example, controllers allow more control to water during the night to reduce evaporation associated with day irrigation. Runoff and puddles in streets, landscapes, and other areas also evaporates, in part, to the atmosphere.

Plants that are over-watered also, we argue, transpire more water than properly watered landscapes. The hardware offered in this program will improve the ability to water at appropriate levels.

Reducing losses to saline or other unusable aquifers or water bodies through percolation or surface flows

Water that runs off and that does not evaporate ends up ultimately in surface water sewer systems that drain into the Bay or the water percolates to either

shallow or deep levels. The water that runs off is not directly usable after it has run off into the Bay. Although water is recycled in the area, the source water is from the sanitary sewer systems, not from surface and street runoff.

However, the percolated excess water may indeed percolate, at least in part, to deep aquifers that store potable water. The latter portion of the excess water that is conserved may indeed not be water waste. For lack of measurements on the amount of excess water that can be returned to the aquifer, we could assume some loss level and recalculate the cost-benefit ratio. Since the resulting benefit-cost ratio is well above the value of 1.0, even if the loss were great, say half of the savings, the benefit-cost ration would still be above 1.0.

We do not envision the reduction or elimination of water losses recovered or potentially recoverable outside the local agency's service area.

F-2 Project Budget and Budget Justification

The budgeted costs include planning, purchase and installation of project-related materials, and administration.

None of the following items are in the budget:

1. Costs, other than those noted above, incurred prior to applying for or receiving funding,
2. Operation and maintenance costs,
3. Purchase of equipment not an integral part of the project,
4. Establishing a reserve fund,
5. Purchase of water supplies,
6. Replacement of existing funding for ongoing programs,
7. Support of existing agency requirements and mandates,
8. Purchase of land in excess of the minimum required acreage necessary to operate as an integral part of the project, as set forth and detailed by engineering and feasibility studies, and
9. Payment of principal or interest of existing indebtedness or any interest payments unless:
    a) The debt is incurred after issuance of a letter of commitment of funds by DWR;
    b) The DWR agrees in writing to the eligibility of the costs for reimbursement before the debt is incurred; and
    c) The purposes for which the debt is incurred are otherwise eligible project costs.

Project Budget

The detailed budget presented in Table B in Part A shows that the following items are included:

- Planning/Design/Engineering. The justification of this cost item is that it will take time to review the ITAP reports to identify and plan the sites to approach with the program. Also, included in this item is evaluation support to provide the project with an independent evaluation of the cost and savings of the program over time.

- Materials/Installation. The justification for the materials and installation items is that this is the core of the program offered. The point of the proposed program is that although conservation opportunities have been identified in detail by ITAP, there exist barriers to implementing the equipment upgrades due to funding issues.

- Administration. Administration will guide and review each element of the program to assure focus, direction, accountability, and compliance with the administrative requirements of the agencies and of the Proposition 13 Grant.

Tables 1 and 2 in Appendix A have entered in them the program costs in the required format according to the application.

F-3 Economic Efficiency

The direct economic benefits accruing to project benefits include:

- Avoided cost of source water supply
- Avoided treatment cost
- Avoided distribution cost
- Avoided costs of landscape over-watering

The SCVWD estimates that its avoided supply projects include groundwater desalination, Bay water desalination, and the South Bay Water Recycling project. Table 4 includes the capital costs, O&M costs, and water supplied for each of these alternatives. The least cost alternative supply is groundwater desalination, which costs $941/AF.

Analysis assumptions

We have used the following assumptions in determining the benefits and costs for the proposed project:

• **Period of analysis.** We have used a period of analysis of 10 years, which accounts for 10 years of effective savings.

• **Inflation and escalation.** We have assumed zero escalation and inflation.

• **Discount rate.** We have used the recommended discount rate of six percent.[1]

• **Dollar value base year.** All benefits and costs are expressed in current year dollars--Year 2002 dollars.

• **Multiple-funded projects.** The economic analysis has been conducted for the entire project, regardless of funding sources.

Project costs. For Tables 1, 2, and 3, all costs required to achieve project benefits have been included.

[1] Since the application calls for conducting the benefit cost analysis in real dollar terms and since six percent is recommended, we assume that the six percent figure is meant to be the real discount rate (not nominal). For example, at two percent inflation, a six percent real discount rate translates into an approximate value of eight percent nominal rate (exactly eight percent with continuous compounding). If the six percent rate was meant to be nominal, then we would adjust for inflation and end up with a four percent real rate.

Avoided Cost of Current Supply Source (Table 4a). Since there are specific water supply projects that are avoidable, we use Table 4b.

Alternative Cost of Future Supply Sources (Table 4b). As mentioned above, the avoided supply costs assumes that new supply projects can be downsized proportionally. To report **only** the portion of the cost of water that would be avoided as a result of the proposed project, we have assumed that 20 percent of the savings at the sample site (Quail Hollow) are attributable to the program.

Water Supply Vendibility (Table 4c). This project does not anticipate changes in revenue from water sales to existing customers, new customers, or other agencies.

Appendix A - Benefit/Cost Analysis Tables

Table 1: Capital Costs

Table 2: Annual Operations and Maintenance Costs

Table 3: Total Annual Costs

Table 4a: Water Supply Benefits: Avoided Cost of Current Supply Sources

Table 4b: Water Supply Benefits: Alternative Cost of Future Supply Sources

Table 4c: Water Supply Benefits: Supplier Revenue (Vendibility)

Table 4d: Total Water Supply Benefits

Table 5: Benefit/Cost Ratio

Table 6: Capital Recovery Factor

Appendix B - Sample ITAP Report

Appendix C – Resume

HOSSEIN ASHKTORAB
Santa Clara Valley Water District

EDUCATION:

Ph.D., University of California, Davis, 1989. Plant, Soil and Water Science.
Master of Science, California State University, Chico, 1981. Irrigation
Bachelor of Science, University of Mazandaran, 1979. Agriculture Engineering.

PROFESIONAL EXPERIENCE:

***Unit Manager*, Water Use Efficiency Unit, Santa Clara Valley Water District Jan. 2001 – Present**

Responsible for managing the District Water Use Efficiency Unit (WUE) providing technical direction, coordinating its activities with other District Units, and external stakeholders including 13 water retailers. The water conservation program is a long-term commitment of the District, which provides the highest quality programs and educational opportunities to residents and businesses in Santa Clara County.

Managing the implementation of all 14 BMPs required by the Memorandum of Understanding Regarding Urban Water Conservation in California (MOU). In addition, managing the adopted Water Conservation Plan (including agriculture water conservation program) to comply with US Bureau of Reclamation mandate as required by the Central Valley Project Improvement Act (CVPIA).

Manage and participate in the development, implementation and administration of the water conservation and water recycling programs with more than $9 million annual budget in Santa Clara County.

Develop partnership with local and regional cities including various water conservation programs with City of San Jose with more than $3 million cost-sharing budget as well as cost-sharing agreement with six other agencies in Northern California for residential efficient clothes washing machine.

Participate and engage in the recycled water partnership such as South Bay Water Recycling cost sharing agreement for the amount of $50 million projects in the Santa Clara County.

Participate and coordinate with local, regional and statewide water conservation and recycling organizations. Member of CUWA water conservation committee and CUWCC steering, plenary, Program committees and several subcommittees.

***Water Conservation Specialist*, Water Conservation & Recycling Unit, Santa Clara Valley Water District Jan. 1997- Jan. 2001**

Developed and managed water conservation programs including programs for agricultural and large landscape water users.

Technical staff to District Landscape Water Advisory Committee, and District Agriculture Water Advisory Committee.

Responsible for implementation of CALFED grants for the District Agricultural and Urban Water Use efficiency programs. Developed proposals and received grant fund for two District's water recycling projects from Propostion-13 grant funding.

In partnership with the Santa Clara Farm Bureau, UC Cooperation Extension, Department of Agriculture, Department of Water Resources, and Santa Clara County Natural Resource Conservation Service, Developed and conducted nine Agricultural Irrigation and Nutrient Management seminars for the County growers and interested groups

***Associate Land Water Use Analyst*, California Department of Water Resources, December 1986 to**

September 1993.

Technical coordinator for the Assembly Bill 325 Task Force Advisory Committee in 1991 and 1992 and facilitated the development of the State Landscape Water Conservation Model Ordinance. Assisted water agencies, cities and counties to develop and implement landscape water conservation guidelines and ordinances.

As a member of the State Water Conservation Advisory Committee, participated in the development of the Best Management Practices (BMPs) in water conservation.

Participated in the negotiation with the agricultural stakeholders and U.S. Bureau of Reclamation for the State Department of Water Resources Drought Water Bank. Developed a new method using nonlinear regression model to estimate crop water requirement values for major crops in the Delta's agricultural area which was the bases for the negotiation of the irrigation water use.

Member of the 1989 and 1992 Xeriscape Conferences Steering Committee and chaired the Award Subcommittee meetings.

RESEARCH AND TEACHING EXPERIENCE:

***Assistant Professor*, Dept. of Irrigation Eng., Shiraz University. Sept.93-June 96.**

Lectured on urban water use and conservation
Lectured on crop water requirements and evapotranspiration.
Lectured on irrigation systems and design.
Directed related laboratories and field trips.

***Research Assistant professor,* University of California, Davis. June 92 - Dec 1997.**
Crop water requirement and water management
3-D Aerodynamic latent heat flux research studies
Field research study on irrigation system and evaluation.

CERTIFICATION:

Irrigation Systems Evaluation
Landscape Irrigation Master Auditor

PROFESSIONAL MEMBERSHIP:
American Society of Civil Engineers
Irrigation Association
American Water Works Association
WaterReuse Association

Appendix D – Letters of Support

Applicant: Santa Clara Valley Water District

THE TABLES ARE FORMATTED WITH FORMULAS: FILL IN THE SHADED AREAS ONLY

Table 1: Capital Costs

	Capital Cost Category *(a)*	Cost *(b)*	Contingency Percent *(c)*	Contingency $ *(d) (bxc)*	Subtotal *(e) (b+d)*
(a)	Land Purchase/Easement	0	0.00%	0	0
(b)	Planning/Design/Engineering	20,893	0.00%	0	20,893
(c)	Materials/Installation	158,699	0.00%	0	158,699
(d)	Structures	0	0.00%	0	0
(e)	Equipment Purchases/Rentals	0	0.00%	0	0
(f)	Environmental Mitigation/Enhancement	0	0.00%	0	0
(g)	Construction/Administration/Overhead	9,116	0.00%	0	9,116
(h)	Project Legal/License Fees	0	0.00%	0	0
(i)	Other	0	0.00%	0	0
(j)	Total (1) (a + ... + i)				188,709
(k)	Capital Recovery Factor: Use Table 6				0.1359
(l)	Annual Capital Costs (j x k)				25,646

(1) Costs must match Project Budget prepared in Section F-2.

Applicant: **Santa Clara Valley Water District**

Table 2: Annual Operations and Maintenance Costs

Administration *(a)*	Operations *(b)*	Maintenance *(c)*	Other *(d)*	Total *(e)*
0	0	0	0	0

Table 3: Total Annual Costs

Annual Capital Costs (1) *(a)*	Annual O&M Costs (2) *(b)*	Total Annual Costs *(c) (a+b)*
25,646	0	25,646

(1) From Table 1, line (l)
(2) From Table 2, column *(e)*

Applicant: **Santa Clara Valley Water District**

Table 4: Water Supply Benefits
(2002 Dollars)

Net water savings (acre-feet/year) **149** **<== Cell (E6)**

4a. Avoided Costs of Current Supply Sources

Sources of Supply	Cost of Water ($/AF)	Annual Displaced Water Supply (AF)	Annual Avoided Costs ($)
(a)	*(b)*	*(c)*	*(d)*
			(b x c)
			0
			0
			0
			0
			0
Total			**0**

4b. Alternative Costs of Future Supply Sources

Future Supply Sources *(a)*	Total Capital Costs ($) *(b)*	Capital Recovery Factor (1) *(c)*	Annual Capital Costs ($) *(d)* *(bxc)*	Annual O&M Costs ($) *(e)*	Total Annual Costs ($) *(f)* *(d+e)*	Supply AF (g)	Unit Cost $/AF (h) =(g/h)	Annual Avoided Costs ($) *(i)* *=(E6*i)*
GW Desalination	46,000,000	0.0665	3,059,000	1,650,000	4,709,000	5,000	$942	$140,328
Bay Desalination	71,530,000	0.0665	4,756,745	3,750,000	8,506,745	5,000	$1,701	
S. Bay Recycling	649,530,421	0.0782	50,793,279	8,626,400	59,419,679	26,300	$2,259	
			0		0			
			0		0			
Total					**72,635,424**			**140,328**

(1) Use number from Capital Recovery Factor Table 6

4c. Water Supplier Revenue (Vendability)

Parties Purchasing Project Supplies *(a)*	Amount of Water to be Sold (AF) *(b)*	Selling Price ($/AF) *(c)*	Expected Frequency of Sales (1) (%) *(d)*	Expected Selling Price ($/AF) *(e)* *(cxd)*	"Option" Fee (2) ($/AF) *(f)*	Total Selling Price ($/AF) *(g)* *(e+f)*	Annual Expected Water Sale Revenue ($) *(h)* *(b x g)*
				0		0	0
				0		0	0
				0		0	0
				0		0	0
				0		0	0
Total							**0**

(1) During the analysis period, what percentage of years are water sales expected to occur? For example, if water will only be sold half of the years, enter 50% (0.5).

(2) "Option" fees are paid by a contracting agency to a selling agency to maintain the right of the contracting agency to buy water whenever needed. Although the water may not be purchased every year, the fee is usually paid every year.

Table 4d. Total Water Supply Benefits

(a) **Annual Avoided Costs of Current Supply Sources from 4a, column *(d)***			0
(b) **Annual Avoided Costs of Alternative Future Supply Sources from 4b, column *(f)***			140,328
(c) **Annual Expected Water Sale Revenue from 4c, column *(h)***			0
(d) **Total Net Annual Water Supply Benefit ($)** (a+b+c)			
			140,328

Applicant: Santa Clara Valley Water District

Table 5: Benefit/Cost Ratio

Project Benefits ($)(1)	140,328
Project Costs ($)(2)	25,646
Benefit/Cost Ratio	5.47

(1) From Table 4d, row (d): Total Annual Water Supply Benefits
(2) From Table 3. column *(c)* : Total Annual Costs

Table 6: Capital Recovery Table (6%)

Life of Project (in years)	Capital Recovery Factor
7	0.1791
8	0.1610
9	0.1470
10	0.1359
11	0.1268
12	0.1193
13	0.1130
14	0.1076
15	0.1030
16	0.0990
17	0.0954
18	0.0924
19	0.0896
20	0.0872
21	0.0850
22	0.0830
23	0.0813
24	0.0797
25	0.0782
26	0.0769
27	0.0757
28	0.0746
29	0.0736
30	0.0726
31	0.0718
32	0.0710
33	0.0703
34	0.0696
35	0.0690
36	0.0684
37	0.0679
38	0.0674
39	0.0669
40	0.0665
41	0.0661
42	0.0657
43	0.0653
44	0.0650
45	0.0647
46	0.0644
47	0.0641
48	0.0639
49	0.0637
50	0.0634